

ART 1/2 MODIFICATION NOTE 1  
(for Electronics Technicians)

SUBJECT : Installation of Data Line Protectors at ART Sites

PURPOSE : To protect the ART system from transient over-voltages

EQUIPMENT AFFECTED : All ART systems

PARTS REQUIRED :

- 1 - DLP-5 Signal Protector
- 2 - DLP-10 Signal Protectors
- 3 - DLP-30 Signal Protectors
- 1 - Roll #18 Stranded Hook-Up Wire
- 1 - Length #14 Stranded Hook-Up Wire
- 1 - Assortment Crimp Lugs
- 4 - 6-32 x 3/8" Flat Head Screws
- 4 - 6-32 Nuts
- 4 - No. 6 Flat Washers
- 2 - 10-32 x 1/2" Pan Head Screws
- 20 - 8-32 x 3/4" Pan Head Screws
- 20 - 8-32 Nuts
- 20 - No. 8 Flat Washers
- 1 - DLP-5 Mounting Plate
- 1 - 24" Coax Cable with BNC Connectors
- 1 - Set Wire Markers

MOD PROCUREMENT : The required parts will be mailed to each station.

SPECIAL TOOLS REQUIRED : None.

TEST EQUIPMENT REQUIRED : DVM

TIME REQUIRED : 8 work hours

General:

Modification Note 1 provides protection to the solid state circuitry in the ART system from transient over-voltages typically caused by

EHB- 9  
Issuance 85- 6  
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lightning. The protectors supplied interface to the control/data lines providing a combination of high speed (nanoseconds) voltage limiting and brute force protection.

Procedure: (see designated figure page for wiring configuration)

I. RCU (Figure 1)

- A. Turn off system power.
- B. Remove the front panel retaining screws and swing open the panel.
- C. Remove the protective fiber glass cover that is over TB1 and TB2.
- D.
  1. Center a DLP-30-6V10 Signal Line Protector on the fiber glass cover.
  2. Using the Signal Line Protector for a template; mark the location of the four mounting holes.
  3. Drill four Number 16 holes in the locations marked.
  4. Attach the DLP-30-6V10 to the cover using the 8-32 nuts, washers, and screws supplied. The screw heads must be on the under side of the cover, the nuts and washers on the Signal Line Protector mounting surface.
- E. Remove the wires numbered 10 through 15 from TB-1 and wire number 16 from TB-2.
- F. Attach those wires to the LOAD side of the Signal Line Protector, terminals 1 through 7.
- G. Measure and cut six #18 and one #14 wires having sufficient length to reach TB-1 and TB-2 from the Signal Line Protector.
- H. Strip the wires at both ends and install lugs and wire markers. The #14 wire should be labeled "9," and the #18 wires "10" through "16."
- I. Install the completed wires between the proper terminals on TB-1 and 2, and the LINE side of the DLP-30-6V10. Connect the #14 wire, number "9" between TB-1 terminal "9" and the GND terminal on the Signal Line Protector.

- J. Replace the fiber glass protector, with the DLP-30-6V10 attached, over TB1 and TB2.
- K. Close the front panel and replace the retaining screws.
- L. Apply power to the system and check all controls and indicators for proper operation.

## II. MDC "J" Box (Figure 2)

- A. Turn off all power to the "J" box.
- B. Locate optimum locations within the "J" box for mounting a DLP-30-6V10 and a DLP-10-20V10. Mark and drill the screw hole locations.
- C. The following wires in cable W22, identified by color and J1 pin number, must be marked, removed from their terminal strip locations, and connected to the designated LOAD terminals on DLP-30-6V10 and DLP-10-20V10.

Pin	Color*	Function	DLP-30 Term
J1-H	BRN	S/D	1
J1-I	RED	STATUS	2
J1-J	ORN	CONTROLS	3
J1-K	YEL	RCU RLS	4
J1-L	GRN	RLS ABORT	5
J1-M	BLU	RCU RET	6
J1-U	WHT/BRN	PED RET	7
			DLP-10 TERM
J1-T	WHT	POWER ON	

\*Colors may vary at some installations

- D. Measure and cut eight #18 wires of sufficient length to reach the vacated terminal strip connections from the two Signal Line Protectors.

- E. Strip the wire ends and install terminal lugs.
- F. Cut a #14 wire to connect the "G" terminals of the two Signal Line Protectors, and a #14 wire to connect one of the "G" terminals directly to a ground bus. Install terminal lugs on both wires.
- G. Install the ten wires on the proper LINE terminals of the two Signal Line Protectors.
- H. Mount the Signal Line protectors in the location selected in step 2.
- I. Attach the LINE terminals of the Signal Line Protector to the proper terminal block functions.
- J. Apply power to the system and check all controls and indicators for proper operation.

### III. Pedestal "J" Box (Figure 3)

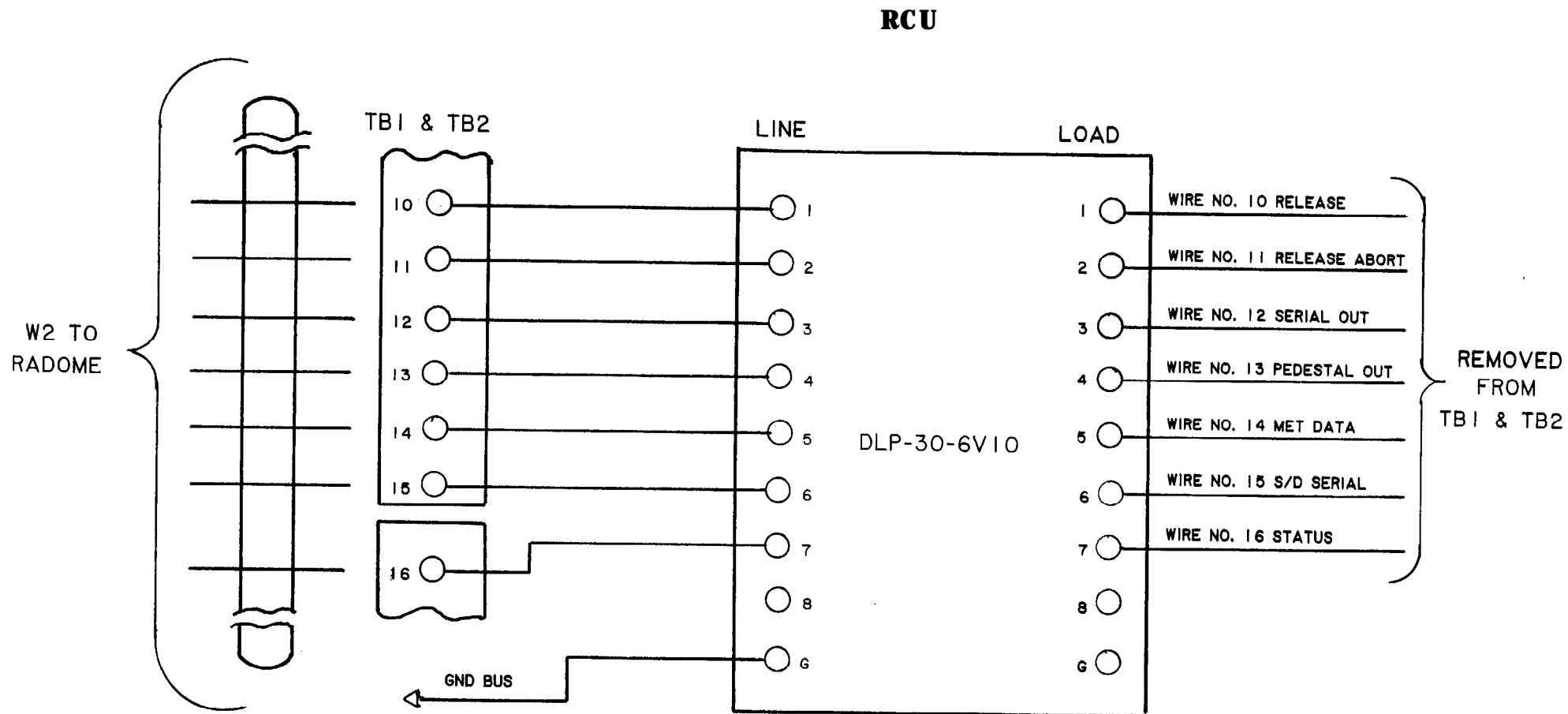
- A. Follow the procedure described in Part II, MDC "J" Box. The J1-Pin designations do not apply to the Pedestal installation.

### IV. DCA

- A. Mount the DLP-5-6V10 in the rear of the cabinet on the vertical rail to your right. Use the two 10-32 screws supplied.
- B. Disconnect the coax to J7 (Met Data) on the MCU and connect it to the LINE side of the Signal Line Protector.
- C. Connect the supplied coaxial cable between J7 and the LOAD side of the Signal Line Protector.
- D. Verify that the Met Data signal is present at the MCU.

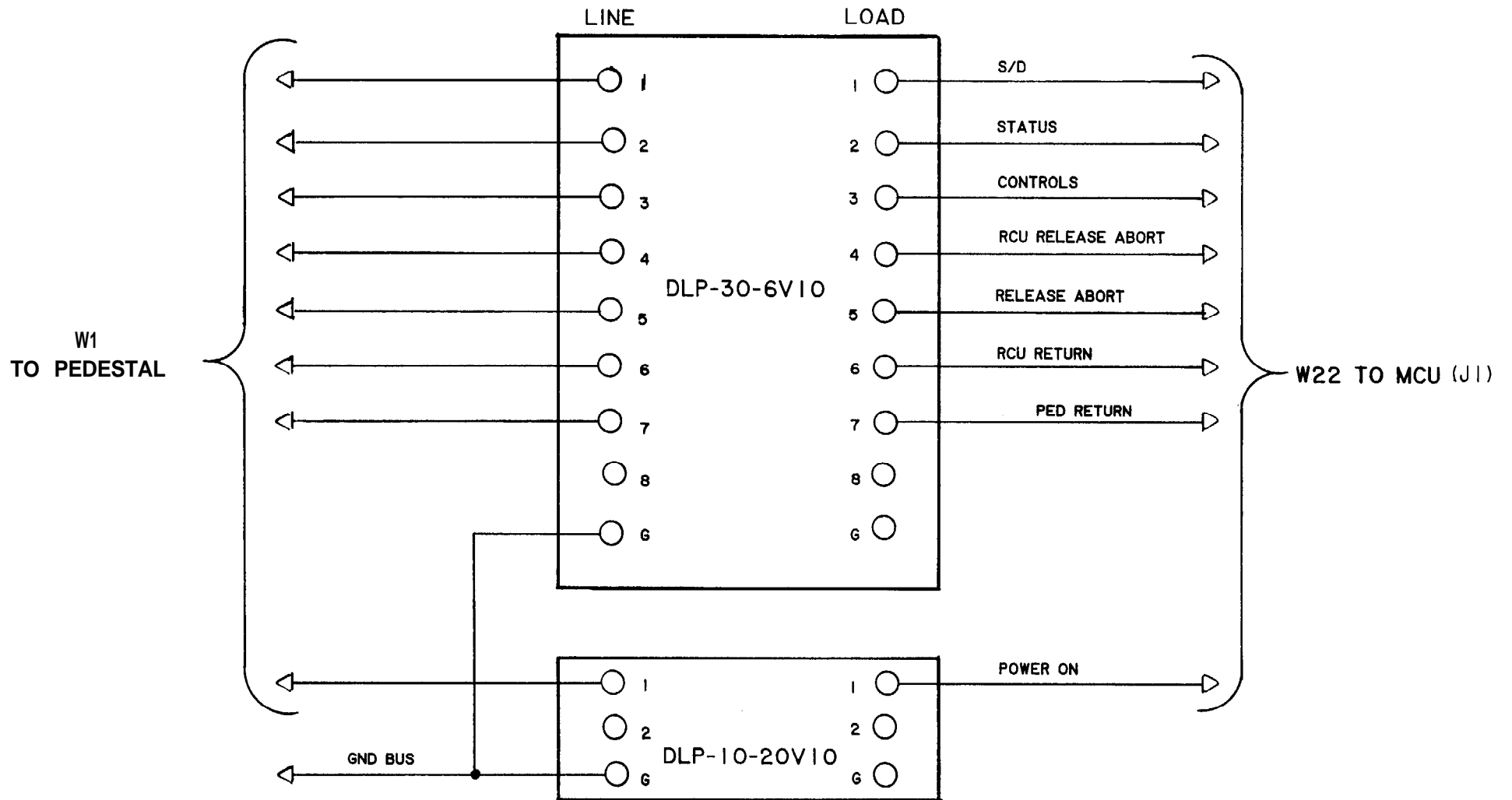
### V. Instruction Manual Changes

No changes to the ART 1 and ART 2 Instruction Manuals are required.



**FIGURE 1**

# MOC "J" BOX



**FIGURE 2**

# RADOME "J" BOX

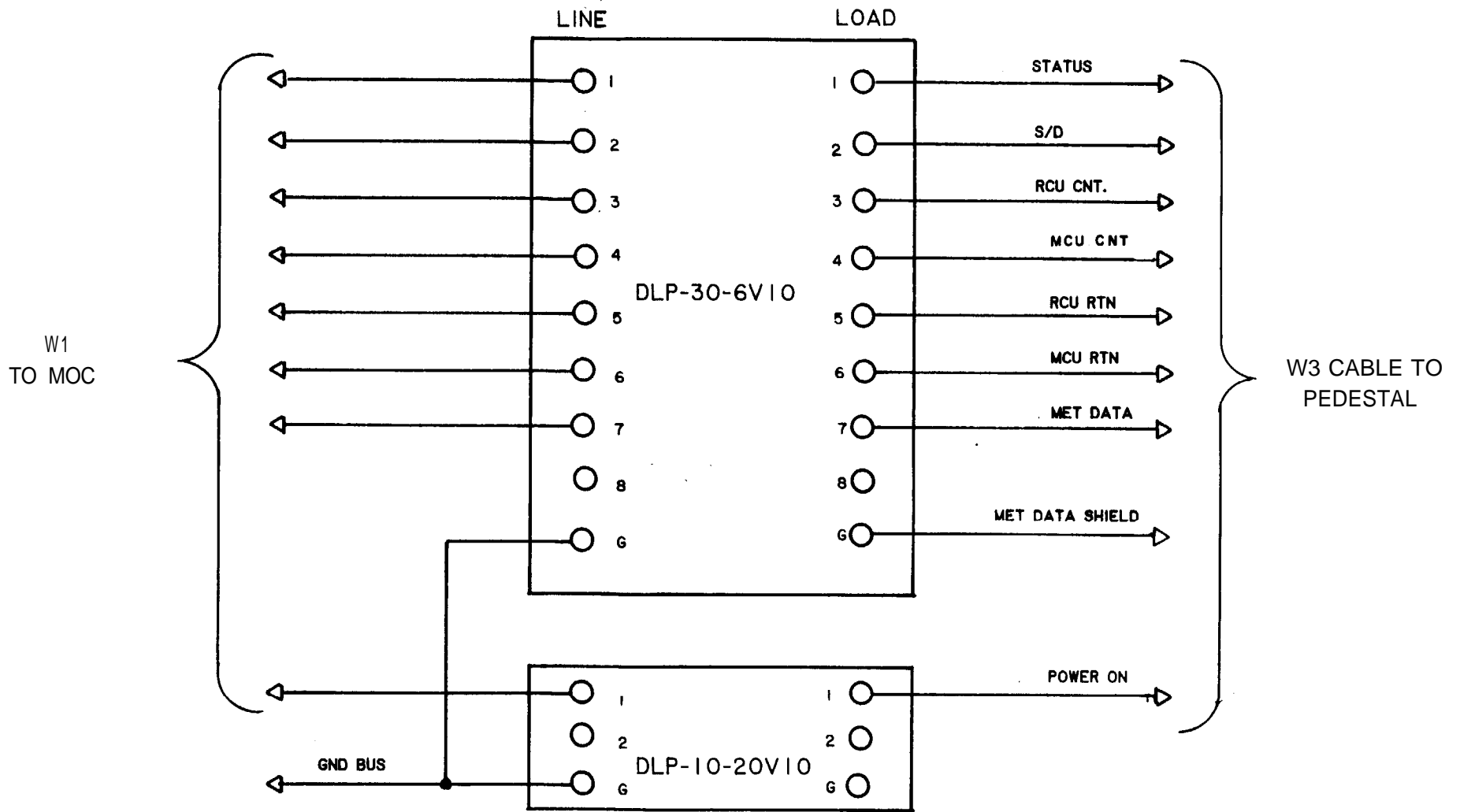
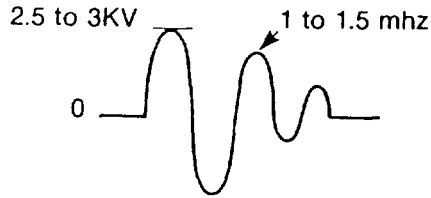


FIGURE 3

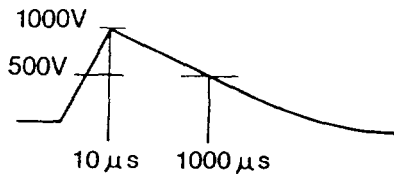
# MCG DATA SHEET

## A. Surge Withstand Capability IEEE Std. 472(SWC):

This is a general purpose test for communications equipment. All MCG Protectors will safely withstand this transient for values of  $R_s = 10$  ohms or greater.



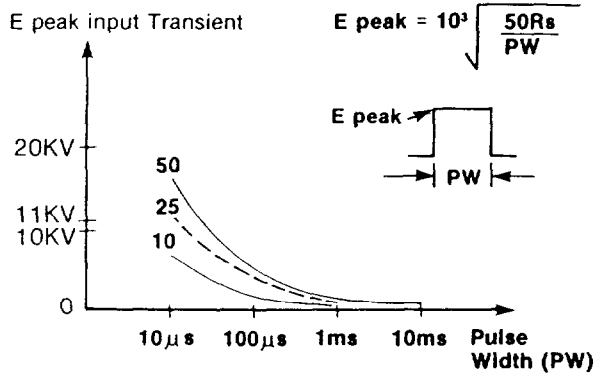
**B. 10 x 1000 u sec Waveform Test:** Extensive industries ‡ have shown that 99.8% of all transients (over a 3 year study period) have amplitudes less than 1KV with rise time of 10 u sec or longer and fall times (to the 50% pt.) of 1000 u sec. A// MCG protectors will meet this demanding specification if  $R_s = 20$  ohms or greater.



‡The most recent published voltage wave form data was taken by Bennison, Ghazi and Ferland\* on the Canadian telephone system and was determined to be essentially the same for U.S. systems.

\* Lightning surges in open wire, coaxial & paired cables; IEEE Transactions Vol COM-21 Oct. '73 pp 1136-43.

**C. Rectangular Pulse Test:** This test is used to define the protectors capabilities on fast rising, high voltage transients that often appear in practice and yet are not fully defined by the IEEE Std. 472(SWC) or the 10 x 1000 u sec tests outlined on the left.



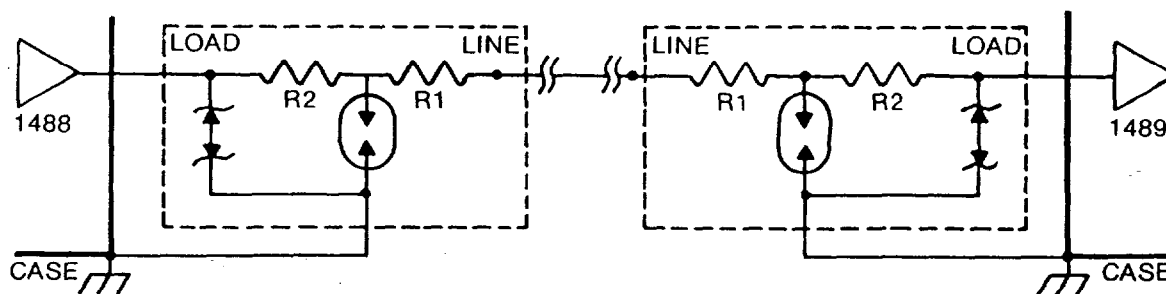
The rectangular pulse test involves the use of a 10 microsecond wide pulse whose peak voltage amplitude depends on the inherent value of  $R_s$  chosen for the protector. Thus a DLP-10-6V25 will be able to successfully withstand a 11KV peak, 10 u sec wide pulse between The "line" side (input) and ground and still protect the sensitive circuitry.

**How to use the above chart.** For a general view of the meaning of  $R_s$  compare the transient withstand voltage versus  $R_s$  at the 10 u sec point. A value of  $R_s = 10$  ohms can withstand = 7KV while a 50 ohm value can withstand = 17KV.

## General Specifications

Output Clamp Voltages (Vc):	±6V, ±10V, ±15V, ±20V, ±25V, ±50V, ±100V, ±200V, ±10% (load side to ground)
Energy handling capability	50 joules/line
Series Resistance ( $R_s$ ):	10, 25, 50, ±10% (Standard)
Response Time:	less than 10 nanoseconds
Operating Temperature:	-55°C to +125°C
Circuit Attenuation (db)	
DLP-5, 6	-1.7 db @ 5mhz
DLP-10,20,30,40	-3db @ 300 khz
	$R_s = 10$ ohms, $R_L = 50$ ohms, C shunt = 50pf
	$R_s = 25$ ohms, $R_L = 1$ K. C shunt = 1500pf

## Typical Protection Circuit



1. ORG		2. PAY PERIOD (Last day)			3. STATION		4. AREA SECTOR		5. INITIALS		6. HOURLY SALARY		7. REPORTED BY:		8. GENERAL PURPOSE		WS FORM H-28 (7-77)		U. S. DEPARTMENT OF COMMERCE NOAA NATIONAL WEATHER SERVICE		
YEAR		MONTH		DAY		REG.														ENGINEERING PROGRESS REPORT	
S E Q	9. STATION	10. AREA SECT	11. CATEGORY PROGRAM	12. WORK TYPE	13. TOTAL - TIME (Hours)					14. TRAVEL MILES	15. PER DIEM (Travel wh. \$)	16. COST CODE	17. COST (Dollars)	18. ORDER NUMBER	19. NOTES						
					RT	NT	PT	MT	ST												
1A			A R T 1	M O D												MOD # 1 ART1 Serial # Date Modification completed					
1B																					
1C			OR													OR					
1D			A R T 2	M O D												MOD # 1 ART2 Serial # Date Modification completed					
1E																					
1F																					
1G																					
1H																					
1I																					
1J																					
1K																					
1L																					
1M																					
N			ADMIN.																		
O			LEAVE																		

**20. REMARKS**

Blocks 1 through 10 must also be filled out.

Enter time required to complete Mod in Col. 13d (MT).

This Mod must be reported into the EMRS System before 30 days following completion of modification

C = CONTRACTS  
T = TRANSPORTATION  
OF THINGS

COST CODES:  
P = PURCHASED LOCALLY  
G = GOVERNMENT FURNISHED

N = NONCAPITALIZED  
PROPERTY  
M = CAPITALIZED  
PROPERTY

FOR LEAVE ENTER WORK TYPE:  
LVA = Annual Leave  
LVC = Compensatory Leave  
LVH = Holiday  
LVS = Sick  
LVM = Military or Other